

Response

Applicant: VanWinkle T. Townsend

Serial No.: 09/847,751

Filed: May 2, 2001

Docket No.: FE-00494

Title: TELEMETRY SYSTEM AND METHOD FOR ACOUSTIC ARRAYS

REMARKS

The following remarks are made in response to the Office Action mailed June 15, 2004. In that Office Action, the Examiner rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Lin et al., Journal of Lightwave Technologies publication ("Lin") in view of Figure 1 of the present application ("Figure 1"). Claims 8, 9, and 12-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lin and Figure 1 as applied to claims 1-7, and further in view of Ishikawa et al., U.S. Patent No. 5,917,637 ("Ishikawa"). Claims 1, 10, and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Green et al., U.S. Patent No. 6,515,939 ("Green"), and further in view of Figure 1.

With this Response, Applicant respectfully traverses the Examiner's rejection of claims 1-25. Claims 1-25 remain pending in the application and are presented for reconsideration and allowance.

35 U.S.C. §103 Rejections

The Examiner rejected claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Lin et al., Journal of Lightwave Technologies publication ("Lin") in view of Figure 1 of the present application ("Figure 1"). Independent claim 1 recites "a first plurality of subsystems coupled to at least a subset of the plurality of acoustic sensors, the first plurality of subsystems configured to receive the analog signals from the acoustic sensors and generate digital values based on the received analog signals . . . each subsystem in the first plurality of subsystems configured to modulate the first set of optical pulses based on the generated digital values and thereby generate a modulated optical pulse stream". The Examiner has acknowledged that Lin does not teach subsystems as recited in claim 1:

The differences between Lin and the claimed invention are (a) Lin does not specify the sensors as acoustic sensors, (b) **Lin does not teach a plurality of subsystems for generating digital values based on analog signals received by the sensors.** Admitted prior art of FIG. 1 teaches acoustic sensors 102 for telemetry application and a plurality of subsystems coupled to a subset of the acoustic sensors for receiving analog signals from the acoustic sensors and generating digital values based on the received analog signals (see page 6, lines 6-18 of instant application). (Office Action at para. no. 2, page 2) (emphasis added).

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Figure 1 of the present application and the corresponding description do not teach or suggest subsystems that are configured to modulate a set of optical pulses based on digital values generated by the subsystems as recited in independent claim 1. In addition, the Examiner has also acknowledged that Lin and Figure 1 do not teach modulators. (See, e.g., Office Action at para. no. 3, page 4).

In view of the above, independent claim 1 is not taught or suggested by Lin and Figure 1, either alone, or in combination. There is also no suggestion to combine Lin and Figure 1. The Applicant respectfully traverses the rejection of claim 1, and reconsideration and allowance of claim 1 is respectfully requested. Since dependent claims 2-7 further limit patentably distinct claim 1, and are further distinguishable over the cited prior art, these dependent claims are believed to be allowable over the cited references. Reconsideration and allowance of claims 2-7 is respectfully requested.

Claims 8, 9, and 12-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lin and Figure 1 as applied to claims 1-7, and further in view of Ishikawa et al., U.S. Patent No. 5,917,637 ("Ishikawa"). Claim 8 recites "wherein each subsystem in the first plurality of subsystems includes an optical modulator for modulating the first set of optical pulses based on the generated digital values." With respect to claims 8 and 9, the Examiner stated that:

However, **Lin and admission fail to teach modulators.** It is well known in the art that a modulator is used to convert electrical signals to optical signals. For example, Ishikawa teaches in FIG. 1 an electro-absorption-type (EA) optical modulator for passing and blocking optical pulses according to applied electrical signal. One of ordinary skill in the art would have been motivated to combine the teaching of Ishikawa with the modified telemetry system of Lin and admission because EA modulator is capable of being driven under low power and is suitable for a size reduction (column 1, lines 46-47). Thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a EA modulator for converting digital values to optical pulses, as taught by Ishikawa in the modified telemetry system of Lin and admission because EA modulator is small and uses low power. (Office Action at para. no. 3, page 4) (emphasis added).

There is no suggestion to combine the cited references in the manner proposed by the Examiner. As pointed out above, the Examiner has acknowledged that Lin and Figure 1 do not

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include any teaching or suggestion regarding modulators. Lin and Figure 1 do not include any teaching or suggestion that the systems disclosed therein could or should be modified to include modulators, nor do Lin and Figure 1 include any suggestion that it would be desirable to add modulators. Ishikawa discloses an electro-absorption modulator (EA modulator), but there is no teaching or suggestion in Ishikawa that the disclosed EA modulator could or should be used in a telemetry system like that shown in Figure 1, or a polarization-insensitive fiber-optic Michelson interferometric sensor (PIFOMIS) system like that disclosed in Lin. Rather, Ishikawa discloses that the EA modulator is configured to be applied to an optical communication system for communicating between two terminal stations (See, e.g., Ishikawa at Title; Field of the Invention; and Figure 12 and corresponding description).

There is also no teaching or suggestion in any of the cited references that the EA modulator of Ishikawa, or any other modulator, could or should be incorporated into a telemetry subsystem that is coupled to acoustic sensors, and that is configured to receive analog signals from the acoustic sensors, and generate digital values based on the received analog signals. Rather, Ishikawa discloses that the EA modulator 4 is integrated with a light source 2, and this integrated chip forms part of an optical transmitter. (See, e.g., Ishikawa at Figure 1; col. 3, lines 40-49; and col. 4, lines 37-40). Thus, Lin, Figure 1, and Ishikawa, either alone or in combination, do not teach each and every limitation of independent claim 1, or dependent claim 8.

In view of the above, dependent claim 8 is not taught or suggested by Lin, Figure 1, and Ishikawa, either alone, or in combination. Since dependent claim 8 further limits patentably distinct claim 1, and is further distinguishable over the cited prior art, dependent claim 8 is believed to be allowable over the cited references. The Applicant respectfully traverses the rejection of claim 8, and reconsideration and allowance of claim 8 is respectfully requested.

Dependent claim 9 recites “wherein each optical modulator modulates the first set of optical pulses by passing and blocking optical pulses in the first set of optical pulses.” With respect to claim 9, the Examiner stated that “Ishikawa teaches in FIG. 1 an electro-absorption-type (EA) optical modulator for passing and blocking optical pulses according to applied electrical signal.” (Office Action at para. no. 3, page 4). The Examiner did not provide a

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citation to any portion of Ishikawa that teaches or suggests modulating optical pulses by passing and blocking the optical pulses as recited in dependent claim 9, nor could Applicant find any such teaching or suggestion.

In view of the above, dependent claim 9 is not taught or suggested by Lin, Figure 1, and Ishikawa, either alone, or in combination. Since dependent claim 9 further limits patentably distinct claim 1, and is further distinguishable over the cited prior art, dependent claim 9 is believed to be allowable over the cited references. The Applicant respectfully traverses the rejection of claim 9, and reconsideration and allowance of claim 9 is respectfully requested.

Independent claim 12 recites “a plurality of optical modulators, each optical modulator configured to receive one of the plurality of streams of optical pulses, each optical modulator configured to receive sensor information from at least one of the sensors, each optical modulator configured to modulate the received stream of optical pulses based on the received sensor information and thereby generate a modulated stream of optical pulses.” The Examiner has acknowledged that Lin and Figure 1 do not teach modulators. (See, e.g., Office Action at para. no. 3, page 4). As described above with respect to claim 8, there is no suggestion in the cited references to combine the references in the manner proposed by the Examiner, and even if the references are combined, the combination does not teach or suggest each and every limitation of claim 8. For the reasons set forth above with respect to claim 8, Lin, Figure 1, and Ishikawa, either alone or in combination, also do not teach or suggest “a plurality of optical modulators, each optical modulator configured to receive one of the plurality of streams of optical pulses, each optical modulator configured to receive sensor information from at least one of the sensors, each optical modulator configured to modulate the received stream of optical pulses based on the received sensor information and thereby generate a modulated stream of optical pulses”, as recited in independent claim 12.

In view of the above, independent claim 12 is not taught or suggested by Lin, Figure 1, and Ishikawa, either alone, or in combination. The Applicant respectfully traverses the rejection of claim 12, and reconsideration and allowance of claim 12 is respectfully requested. Since dependent claims 13-19 further limit patentably distinct claim 12, and are further distinguishable

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over the cited prior art, these dependent claims are believed to be allowable over the cited references. Reconsideration and allowance of claims 13-19 is respectfully requested.

Independent claim 20 recites “receiving the plurality of streams of optical pulses with a plurality of optical modulators” and “modulating each of the received streams of optical pulses with the plurality of optical modulators based on sensor information generated by the array of sensors, and thereby generating a plurality of modulated streams of optical pulses”. The Examiner has acknowledged that Lin and Figure 1 do not teach modulators. (See, e.g., Office Action at para. no. 3, page 4). As described above with respect to claim 8, there is no suggestion in the cited references to combine the references in the manner proposed by the Examiner, and even if the references are combined, the combination does not teach or suggest each and every limitation of claim 8. For the reasons set forth above with respect to claim 8, Lin, Figure 1, and Ishikawa, either alone or in combination, also do not teach or suggest “receiving the plurality of streams of optical pulses with a plurality of optical modulators” and “modulating each of the received streams of optical pulses with the plurality of optical modulators based on sensor information generated by the array of sensors, and thereby generating a plurality of modulated streams of optical pulses”, as recited in independent claim 20.

In view of the above, independent claim 20 is not taught or suggested by Lin, Figure 1, and Ishikawa, either alone, or in combination. The Applicant respectfully traverses the rejection of claim 20, and reconsideration and allowance of claim 20 is respectfully requested. Since dependent claims 21-25 further limit patentably distinct claim 20, and are further distinguishable over the cited prior art, these dependent claims are believed to be allowable over the cited references. Reconsideration and allowance of claims 21-25 is respectfully requested.

Claims 1, 10, and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Green et al., U.S. Patent No. 6,515,939 (“Green”), and further in view of Figure 1. As described above with respect to the rejection of claim 1 as being unpatentable over Lin in view of Figure 1, the Examiner has acknowledged that Lin does not teach subsystems as recited in claim 1 (Office Action at para. no. 2, page 2), and Figure 1 of the present application and the corresponding description do not teach or suggest subsystems that are configured to modulate a set of optical pulses based on digital values generated by the subsystems as recited in

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independent claim 1. Green also does not teach or suggest subsystems that are configured to modulate a set of optical pulses based on digital values generated by the subsystems as recited in independent claim 1.

In view of the above, independent claim 1 is not taught or suggested by Lin, Green, and Figure 1, either alone, or in combination. There is also no suggestion to combine Lin, Green, and Figure 1. The Applicant respectfully traverses the rejection of claim 1, and reconsideration and allowance of claim 1 is respectfully requested. Since dependent claims 10 and 11 further limit patentably distinct claim 1, and are further distinguishable over the cited prior art, these dependent claims are believed to be allowable over the cited references. Reconsideration and allowance of claims 10 and 11 is respectfully requested.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-25 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-25 is respectfully requested.

No fees are required under 37 C.F.R. 1.16(b)(c). However, if such fees are required, the Patent Office is hereby authorized to charge Deposit Account No. 50-0471.

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The Examiner is invited to contact the Applicant's representative at the below-listed telephone numbers to facilitate prosecution of this application.

Respectfully submitted,

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CERTIFICATE UNDER 37 C.F.R. 1.8:

The undersigned hereby certifies that this paper or papers, as described herein, are being deposited in the United States Postal Service, as first class mail, in an envelope address to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on this 14th day of September, 2004.

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